Construction Program Procedure Bulletin

CPB 00-2 High Groundwater

References: Construction Manual Section 6-19
Standard Specifications Sections 19-2.02 "Unsuitable Material",
19-3.04 "Water Control and Foundation Treatment", and
19-3.08 "Payment"

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Background

Construction through highly erodible soils subject to high groundwater requires extensive design features that control the effects of rising groundwater, soil migration, and liquefaction.

Without permanent control of the groundwater table in the project area, saturated soil conditions will continue, which could lead to liquefaction during seismic activity, differential settlement of the subgrade due to fluctuation groundwater, or failure of drainage systems caused by joint displacement.

Considerations

When sub-excavating and placing a layer of gravel to provide solid bedding for culverts, consider placing a geotextile fabric fully around the gravel, especially when working in highly erodible silty sands. In this saturated soil condition, fine material is likely to migrate into the gravel voids and cause differential settlement; thereby leading to joint displacement and possible failure of the drainage system.

Access for compaction testing in deep trenching operations may be limited by trench stability, safety, and other access concerns. A cement slurry backfill or controlled low strength material may be used where compaction under the pipe spring line is difficult, as long as adequate culvert anchoring measures to prevent culvert pipe floating are employed. The slurry should be adequately vibrated into position under the spring line of the culvert.

Underdrain systems should be located below the invert of adjacent storm water systems when feasible. Consider using watertight joints in culverts when working in the presence of high groundwater tables and highly erodible soils.

New Procedure

When groundwater is encountered during any excavation and it is determined that adequate control measures are missing from the contract, the resident engineer should:

? Contact the project manager, design engineer, hydraulics engineer, and geotechnical engineer to discuss the current field conditions and develop alternatives to correct impacts of high groundwater on the finished project.

? Evaluate the contract documents to determine if this work is covered under the original provisions of the contract or whether the contractor is entitled to additional compensation. Prepare and process a contract change order, document project activities, and process extra work records if necessary.

This procedure will be incorporated into the next revision of the Construction Manual. It is currently available on the Construction Program's website:
http://www.dot.ca.gov/hq/construc/cpb/cpbindx.htm

Responsibility

Resident engineers review the adequacy of the contract plans, compare anticipated with actual field conditions and request expert advice when high groundwater levels are encountered during any excavation.

Construction engineers provide oversight regarding high groundwater levels, expert opinion regarding covered and non-covered work under the contract, and facilitate support activities from functional units on an as-needed basis.